OIL SEPARATOR MAINTENANCE PROGRAM

Every month the following will be done:

1. Inspect and note levels of oil and sediment present.
2. Replace absorbent pads as needed (at least twice a year).
3. Should trapped oil thickness be over 1/2" then oil should be pumped out.
4. Record pertinent information on inspection form.

Every 12 months the following will be done:

1. Remove any contained oil present.
2. Pump out remaining liquids.
3. Measure sediment thickness in the bottom of the oil separator. If thickness is greater than 1" average or should the operation of the separator be affected by the sediment, then all the sediment shall be removed.
4. Clean out sediments in inlet and outfall manholes and in piping loading to the separators from the inlet manholes.
5. check interior of oil separator for visible seepage; caulk as needed.
6. On coalescing plate separators, carefully clean sediment from plastic louvers.
7. Record pertinent information on form.

TECH 42_001

TO Bob

FROM

JEFFREY W. WINTER, P.E.
Airport Engineer
King County International Airport
P. O. Box 68848
Seattle, WA 98168
(206) 296-7380

SUBJECT Oil Separators

FOLD HERE

DATE 10-19-93

Here are the revised maintenance schedule & forms & layouts for the oil separators. Please set up a regular schedule for this work.

If you have some written inspection reports that were done in the past I'd like to get a copy.

SIGNED JWinter

OIL SEPARATOR MAINTENANCE RECORD

KING COUNTY INTERNATIONAL AIRPORT

Oil Separator #_____ Inspector:_____ Date_____

	CHECKLIST	MEASUREMENT
_____	Measure Oil Thickness	_____ Inches
_____	Replace Absorbent Pads as Needed	
_____	Pump Out Oil	_____ Gallons
_____	Pump Out Remaining Liquids	_____ Gallons
	Measure Sediment Thickness:	
_____	In Oil Separator	_____ Inches
_____	In Inlet Manhole	_____ Inches
_____	In Inlet Manhole	_____ Inches
_____	In Outlet Manhole	_____ Inches
_____	In Inlet Piping	_____ Inches
_____	Remove Sediments From Separator	_____ Gallons
_____	Remove Sediments From Manholes	_____ Gallons
_____	Clean Inlet Piping	
_____	Note Condition of Baffles:	

_____

_____

_____ Check for visible ground water seepage into oil separator, check for gaps between baffles and walls.

_____ Caulk As Needed

_____ Note Condition of Coalescing Plates:

_____

_____

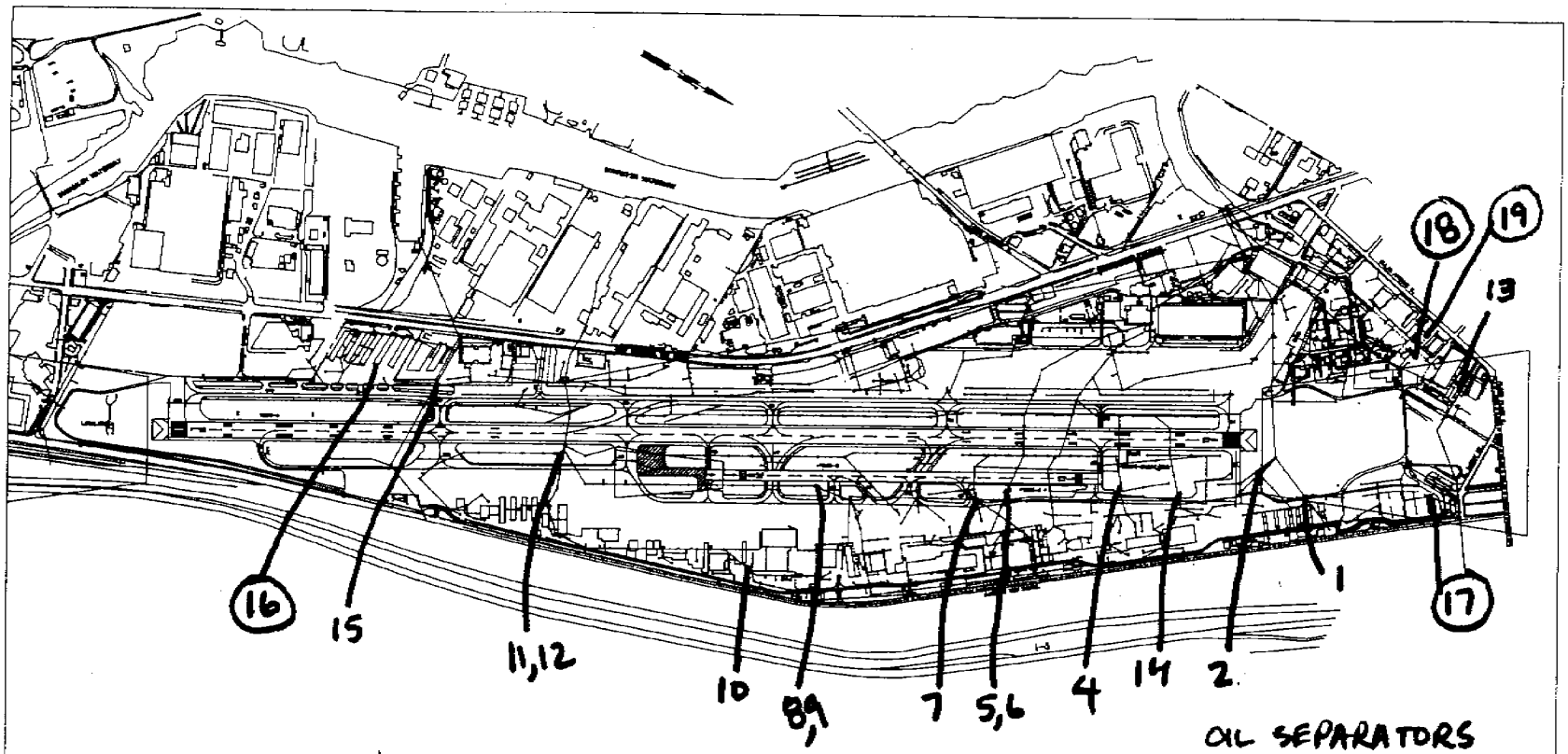
_____ Clean Coalescing Plates

Notes: _____

_____

_____

_____



OIL SEPARATORS

3 = OIL SEPARATOR # TO STORM

(16) = OIL SEPARATOR # TO SANITARY

SCALE: 1" = 1500'

- CATCH BASIN
- MANHOLE
- OIL SEPARATOR

FILE: \FACILITY\LAYOUT\LAYOUT02 CONTRACT #: 000

KING COUNTY INTERNATIONAL AIRPORT
BOEING FIELD SEATTLE, WASHINGTON

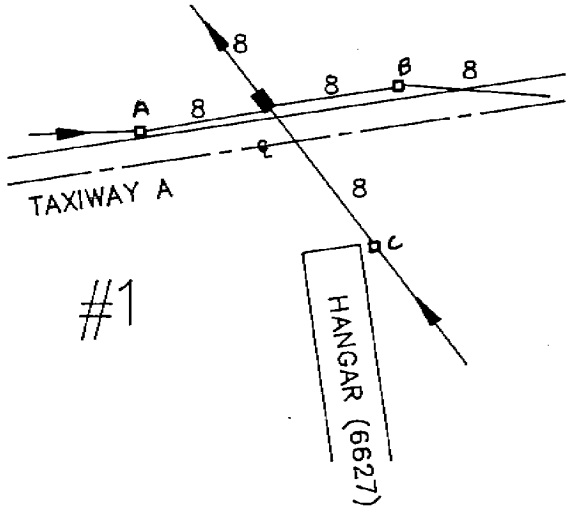
PRELIMINARY
STORM DRAINAGE MAP

APPROVED Donald W. Smith, A.I.
Jeffrey W. Winter, P.E.

DRAWN J WINTER DATE 10-1-93

SHEET 1 OF 1

BY	DATE	CHANGE
REVISIONS		



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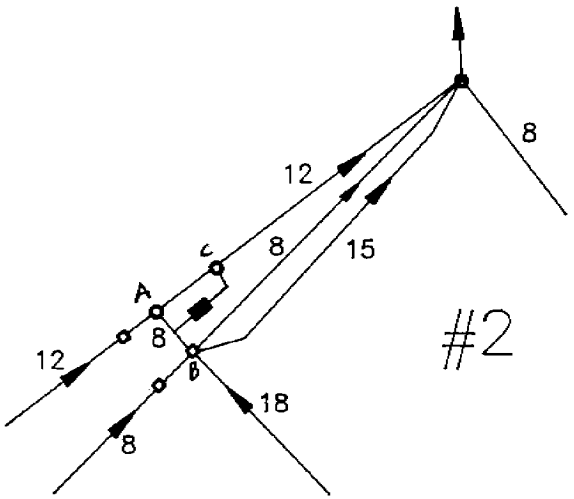

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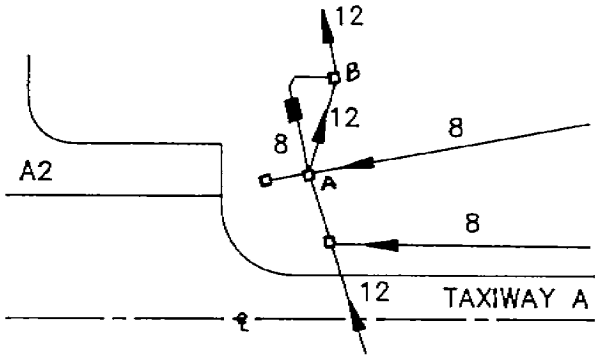

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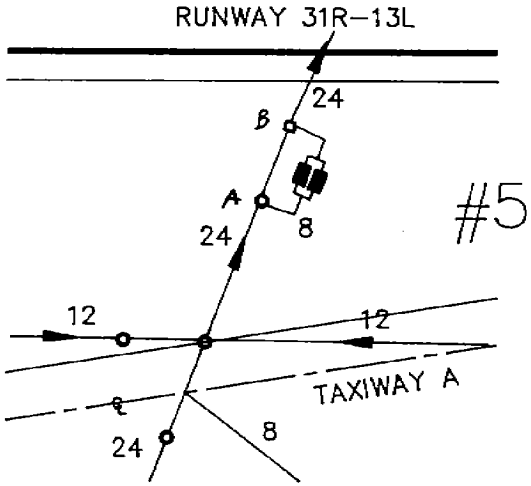

#5,6

LEGEND

- CATCH BASIN
- MANHOLE
- OIL SEPARATOR
- 8 PIPE (in Inches)

KING COUNTY AIRPORT
OIL SEPARATOR SHEET 1
SCALE 1"=100'
10–12–93

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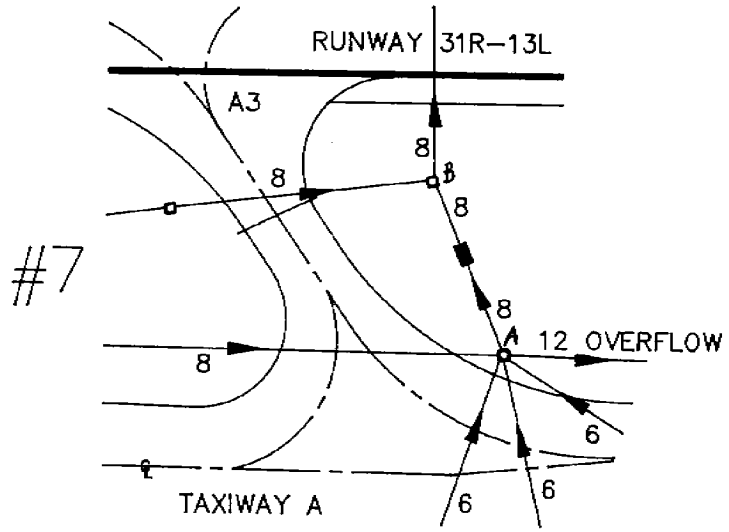
SEA427703



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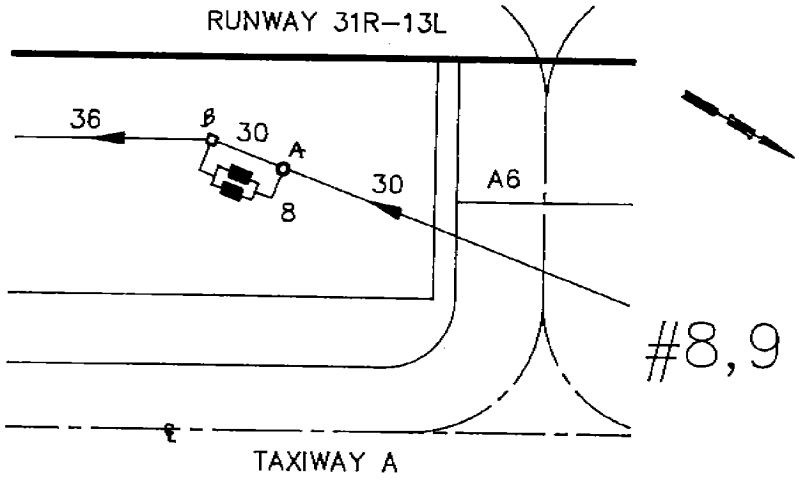

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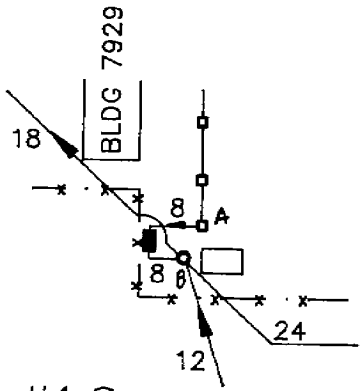

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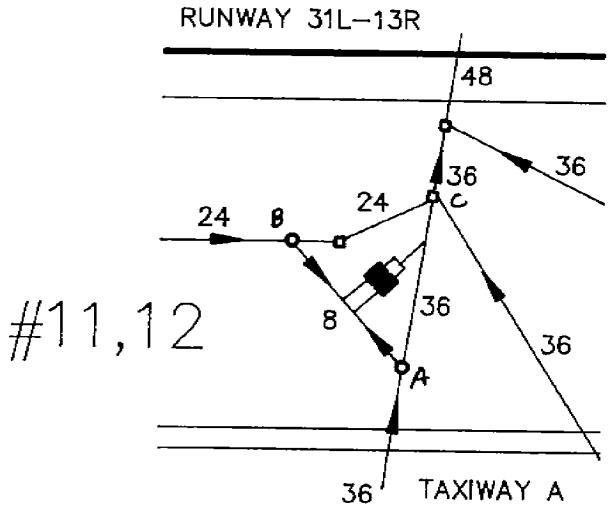

#11,12

LEGEND

- CATCH BASIN
- MANHOLE
- OIL SEPARATOR
- 8 PIPE (in Inches)

KING COUNTY AIRPORT
OIL SEPARATOR SHEET 2
SCALE 1"=100'
10–12–93

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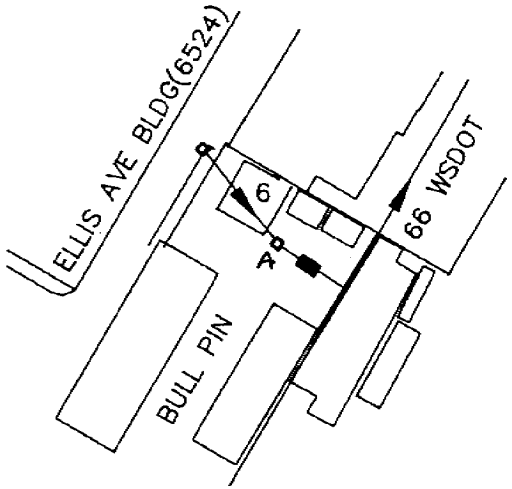
SEA427704



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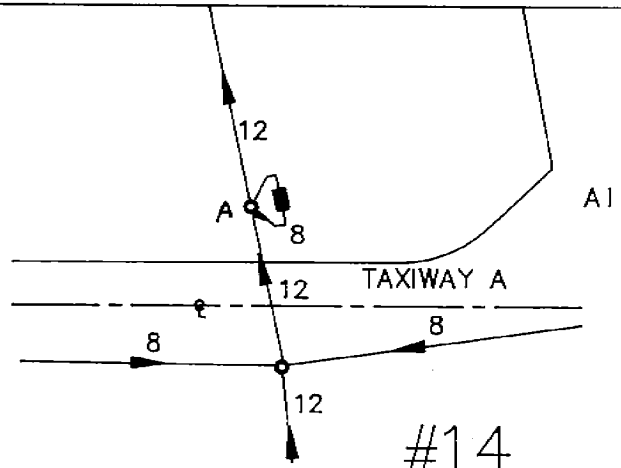

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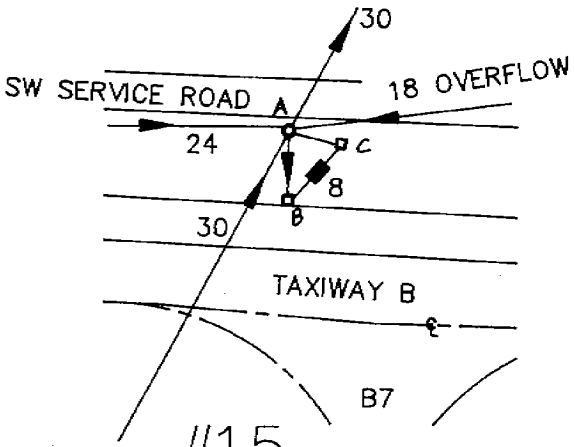

#15

LEGEND

- CATCH BASIN
- MANHOLE
- OIL SEPARATOR
- 8 PIPE (in Inches)

KING COUNTY AIRPORT
OIL SEPARATOR SHEET 3
SCALE 1"=100'
10-12-93

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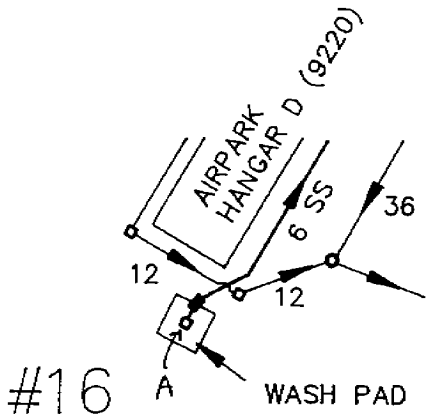

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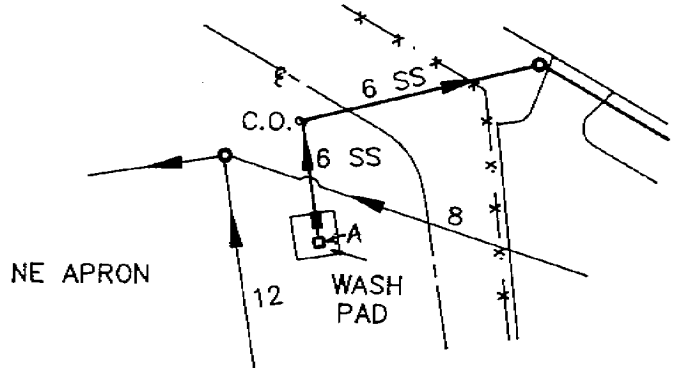

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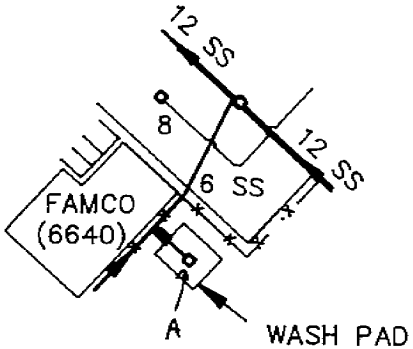

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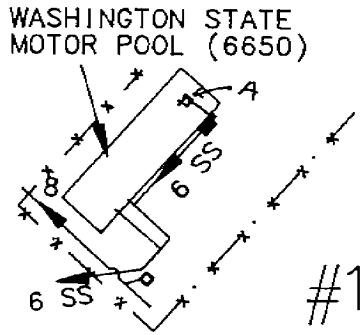

#19

LEGEND

- CATCH BASIN
- MANHOLE
- OIL SEPARATOR
- 8 — SD PIPE (in Inches)
- 6 — SS PIPE (in Inches)

KING COUNTY AIRPORT
OIL SEPARATOR SHEET 4
SCALE 1"=100'
10-12-93

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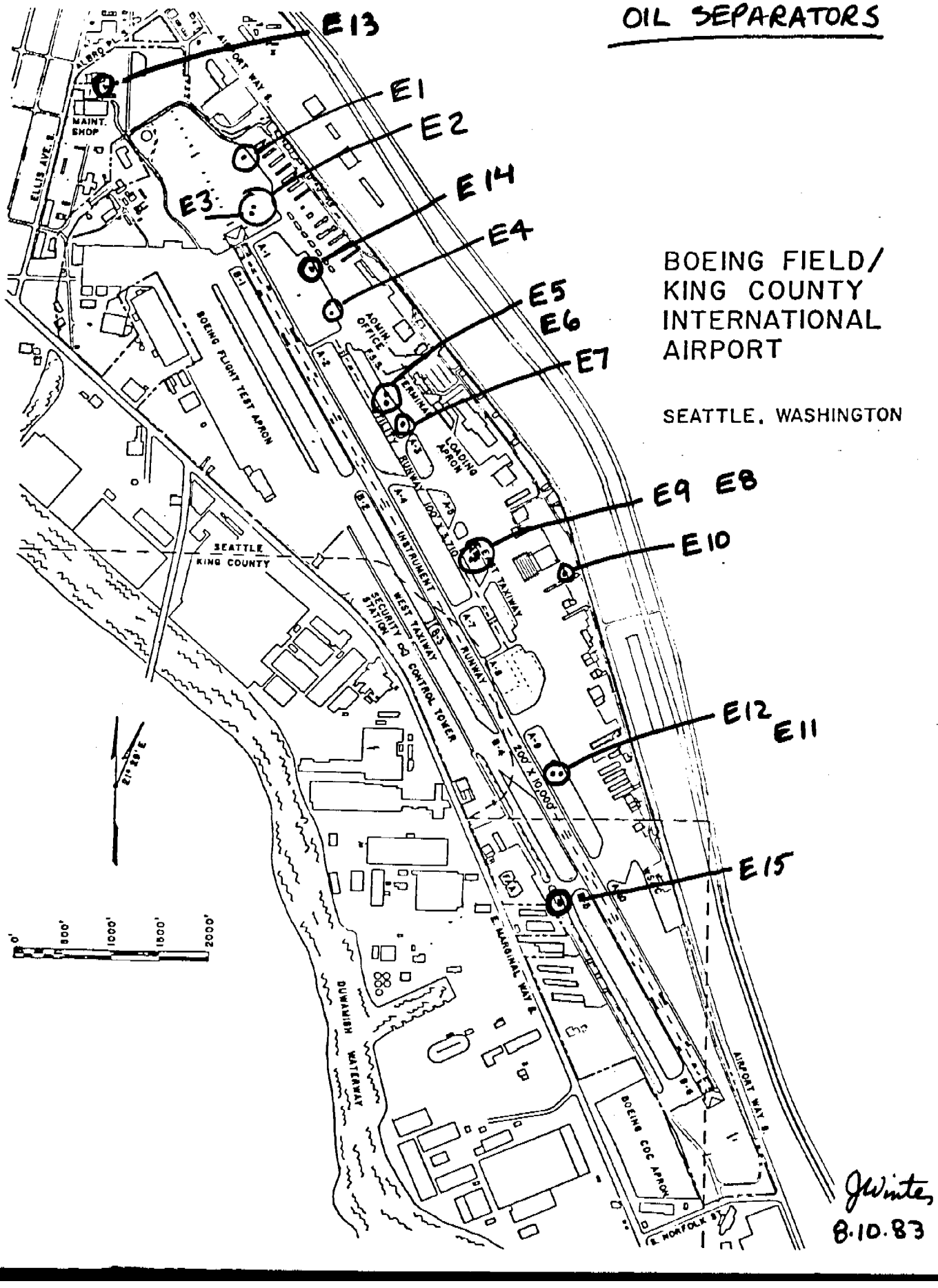
SEA427706


OIL SEPARATORS
E13
E1
E2
E14
E3
E4
E5
E6
E7
E9
E8
E10
E12
E11
E15
BOEING FIELD/
KING COUNTY
INTERNATIONAL
AIRPORT
SEATTLE, WASHINGTON
MAINT. SHOP
ELLIS AVE. S
AIRPORT WAY S
BOEING FLIGHT TEST APRON
ADMIN OFFICE
FBS
EQUIPMENT
LOADING APRON
RUNWAY 100' X 3710'
SEATTLE
KING COUNTY
INSTRUMENT
WEST TAXIWAY
SECURITY & CONTROL TOWER
RUNWAY 200' X 10000'
E. MARGINAL WAY S
DUWAMISH WATERWAY
BOEING COC APRON
E. NORFOLK ST
0'
500'
1000'
1500'
2000'
J.Winter
8.10.83

TO Bob

FROM

JEFFREY W. WINTER, P.E.
Airport Engineer
King County International Airport
P. O. Box 68245
Seattle, WA 98168
(206) 296-7380

SUBJECT Oil Separators

FOLD HERE

DATE 10-8-93

It's apparent that we are not keeping a record of what's being done in maintenance to the oil separators. Nor is the original maintenance schedule prepared in 1993 being followed. Here's a draft of the maintenance schedule & inspection sheet. Please review these and edit or comment.

This maintenance will help us with our DOE Storm Water Permit.

Also here's an updated numbering for the oil separators. The numbers are the same except I've deleted the "E".

At this point we won't be maintaining 18 & 19 only just monitoring them condition & the tenants will have to clean out.

SIGNED

- Baffle height to depth ratios of 0.85 for top baffles and 0.15 for bottom baffles

The separator is first sized for depth using the equation:

$$\text{Depth} = (Q/2V_h)^{1/2}$$

where: Q = design flow (cfm)

V_h = design horizontal velocity (fpm) = 0.50 (15 times 0.033)

Calculate the width using the above ratios (i.e., 0.3 to 0.5 depth-to-width ratio).

Then calculate length using the equation:

$$\text{Length} = \frac{\text{Depth}}{\text{Rise Rate}} * V_h = \frac{(Q/2V_h)^{1/2}}{0.033} * 0.50 = \frac{(Q/2V_h)^{1/2}}{0.066}$$

CPS-Separator Sizing

Calculate the projected (horizontal) surface area of plates required using the following equation:

$$A_p = \frac{Q}{\text{Rise Rate}}$$

Where A_p = projected surface area of the plate ($ft.^2$); note that the actual surface area, $A_a = A_p$ * cosine H

H = angle of the plates with the horizontal in degrees, usually varies from 45-60 degrees.

Q = design flow (cfm).

Rise rate - recommend using 0.033 ft/min.

Manufacturers of plate packs provide standard size packages which are rated at a particular flow (usually in gpm). However, as the manufacturer's flow rating is for conditions different than used above, the engineer must compare the plate surface area with the above calculation. Do not confuse the projected plate area with actual plate area (see Figure III-7.4).

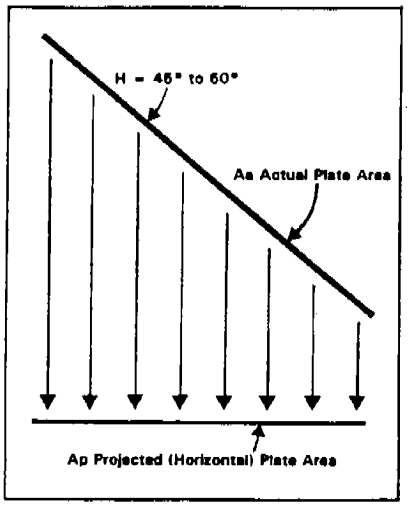
The width, depth, and length of the plate pack and the chamber in which the plate pack is placed is completely flexible and is a function of the plate sizes provided by the particular pack manufacturer and standard size vaults that are available for small sites.

III-7.3 CONSTRUCTION AND MAINTENANCE

Construction Specifications

There are no special construction considerations.

Figure III-7.4 Cross-Section of CPS Oil/Water Separator



Maintenance

Oil/water separators must be cleaned frequently to keep accumulated oil from escaping during storms. They must always be cleaned by October 15 to remove material that has accumulated during the dry season, and again after a significant storm. In addition:

1. The facility shall be inspected weekly by the owner.

2. Oil absorbent pads are to be replaced as needed but shall always be replaced in the fall prior to the wet season and in the spring.

3. The effluent shutoff valve is to be closed during cleaning operations.

4. Waste oil and residuals shall be disposed in accordance with current local government Health Department requirements.

5. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at a discharge location approved by the local government.

6. Any standing water removed shall be replaced with clean water to prevent oil carry-over through the outlet weir or orifice.